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Yield and Emission Line Ratios from ICF Target Implosions with multi-mode Raleigh-Taylor Perturbations*

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In this paper we report results of detailed spectral postprocessing calculations of indirectly driven ICF implosions. We use Lasnex to simulate a two-dimensional capsule with surface perturbations covering a range of wavelengths. The perturbations grow during the Raleigh-Taylor unstable phases of the implosion. The Lasnex hydrodynamic simulations are postprocessed using detailed atomic kinetics models to produce simulated spectra of argon and titanium. Argon is mixed with the fuel and its emission line ratios are used to diagnose fuel temperature. The titanium placed as a dopant in the inner regions of the plastic shell and its line emission is used to diagnose the mixing of fuel and pusher material. The models are run for several values of capsule surface roughness. We compare the yield and line emission as a function of surface roughness. Our results are compared to the predictions of Haan's mix model, which computes a mix depth based on Lasnex runs with single wavelength Raleigh-Taylor perturbations.

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